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Stibnite.—The stibnite crystals from Japan, which Professor E. S. Dana has recently studied (vide NATURALIST, Nov., 1883, p. 1159) have also been investigated by Krenner[1] at Buda-Pesth and by Brun.[2] The former adds three new forms, $\frac{3}{17}P$, $\frac{3}{13}P$ and $\frac{5}{19}P$, to the seventy observed by Dana, making the whole number of forms now known on stibnite, eighty-eight. M. Wada,[3] of Tokio, in a recent paper read in Berlin on some Japanese minerals, gives the correct stibnite locality as Ichinokawa, in the town of Ojoin-mura near Saijo, Province Iyo, Island of Shikoku. Dana's locality is incomplete, since "*Kosang*," in Japanese means "mine," and "*Jaegimeken Kannaizu*," chart of the district of Jaegime.

BOTANY.[4]

SEEDLESS APPLES.—During the past autumn my friend, Mr. C. Gibb, called my attention to some seedless apples of the St. Lawrence variety. They were all from the same tree, and there were originally quite a large number. The normal diameter of the St. Lawrence apple may be given at about $7^{cm.}$ Examination of the specimens showed a somewhat conspicuously flattened form in axial direction; color chiefly yellowish-green; diameter varying from 2.9^{cm} to $5^{cm.}$ Longitudinal and transverse sections gave the same result in each case, and showed (a) complete suppression of the carpels, and so of the ovules; (b) suppression of the vascular structure to such a degree that no fibro-vascular bundles could be seen with the naked eye, as is usually the case.—*D. P. Penhallow, Montreal, Canada.*

WHY FLOWERS BLOSSOM EARLY.—Mr. Meehan in his Native Flowers refers to the early blossoming of *Symplocarpus fœtidus.* In the AM. NAT., Nov., 1883, I tried to show that most spring flowers had their next year's growth well developed in the underground buds of winter, and that spring simply called forth what was already prepared in the winter bud or hibernaculum of the plant. Mr. Meehan says that the flowers of the skunk cabbage must have been prepared to some extent already in the previous winter, and that this may account for their early blossoming. I found this to be entirely correct, and being curious to know the extent of development in our spring plants during the intense heat of summer, I opened a number of the subterranean buds of plants on the 25th and 26th of August. It may be of interest to know that next year's peduncle of the skunk cabbage was 45^{mm} long; the spathe was 55^{mm} long, its upper half being already mottled with purple and yellowish-green; the spadix was 20^{mm}

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[1] Földtani Közlöny, 1883, XIII, p. 1.

[2] Arch. d. sciences ph. et nat. Genève (3), IX, p. 514.

[3] Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin, 17 Juni, 1884, 79–86.

[4] Edited by PROFESSOR CHARLES E. BESSEY, Lincoln, Nebraska.

long. The so-called flower, therefore, was almost half its full size. The flower and peduncle of *Anemone hepatica* were 4^{mm} long; of *Sanguinaria canadensis*, 3^{mm}; of *Arisæma dracontium*, 3^{mm}. The flowers of *Trillium grandiflorum* was 8^{mm} long.

The hibernaculum of *Aralia quinquefolia* in all the plants examined was composed of three scales, the innermost entirely sheathing next year's flowering stalk and also a small bud. The latter is in the axil of the scale, and is destined to produce the flowering stalk two years hence. The leaf of the flower stalk which is opposite to the last scale is always the largest. When the leaves occur in whorls of fours, as was frequent in the specimens at hand, the relative stage of development of the leaves and their position suggested a contracted spiral of leaves rather than a single and sessile twice-compound leaf, as suggested by Gray (Manual, p. 199). The flowers could easily be determined, the outermost flowers being developed the most. In view of the early development in bud of the flowers of spring plants, need their early appearance in spring be surprising? *Aralia quinquefolia* flowers in July, and in August of the same year shows ripened berries and the parts of next year's plant! Is it not rather surprising that with the small amount of vegetation it is compelled to produce, it does not flower much earlier?—*Aug. F. Foerste, Granville, Ohio.*

A SIGNIFICANT DISCOVERY.—In a recent number of *Nature*, Mr. W. T. Thiselton Dyer calls attention to a most interesting and significant discovery in the development of certain ferns. Some months ago Mr. E. T. Druery observed in *Asplenium filix-fœmina*, var. *clarissima*, that the sporangia "did not follow their ordinary course of development, but assuming a more vegetative character, developed more or less well-defined prothallia," which ultimately bore antheridia and archegonia. "From these adventitious prothallia the production of seedling ferns has been observed to take place in a perfectly normal way." The prothallia were subsequently observed by Mr. F. O. Bower to be furnished with root-hairs!

The last-named observer was so fortunate as to discover a still more remarkable development upon *Polystichum (Aspidium) angulare*, var. *pulcherrima*. Here the apex of the pinnules grew out into an irregular prothallium, upon which antheridia and archegonia were clearly made out.

It is a genuine pleasure to note such discoveries, for they are just what we have reason to expect. If, now, so great a change in the ordinary course of development as this is, can take place so suddenly, does it not, to say the least, argue in favor of the *possibility* of similar changes in the past having given rise to the phanerogams? What essential difference is there between these aposporous ferns and the lower phanerogams? The most remarkable feature about the discovery is the fact that it pertains to pteridophytes of as low a type as the ferns of the Polypodiaceæ. If it occurs there, may we not look for it confidently in the Lycopods, and especially in the Selaginellæ. It may be worth giving a good deal of attention to a careful examination of the greenhouse grown plants of the various species of Selaginella. Apospory in these would possess many interesting features. Who will search for it?

THE HISTORY OF DISCOVERY IN FERNS.—Mr. W. T. T. Dyer gives, in *Nature*, a summary of the progress of discovery with respect to the structure of the reproductive apparatus of the ferns. It is of so much interest that we reproduce it here:

1597	Gerarde	Observed seedling plants near parents.
1648	Cæsius	Sporangia.
1669	Cole	Spores.
1686	Ray	Hygroscopic movements of sporangia.
1715	Morison	Raised seedlings from spores.
1788	Ehrhart	Prothallium.
1789	Lindsay	Germination of spores.
1827	Kaulfuss	Development of prothallium.
1844	Nägeli	Antheridia.
1846	Suminski	Archegonia.
1874	Farlow	Apogamy.
1884	Druery	Apospory.

What better illustration do we need of the slowness of discovery?

DE BARY'S COMPARATIVE ANATOMY OF VEGETATIVE ORGANS.—Between seven and eight years ago there appeared a most valuable contribution to the literature of histological botany from the pen of the great Strassburg professor. In its German form it has been familiar to workers in botanical laboratories, and has been of great service. Now we have an English translation by F. O. Bower and D. H. Scott, which has been brought out under the title of Comparative Anatomy of the vegetative organs of the Phanerogams and Ferns, by the Clarendon Press in England, and placed before the American public by the New York house of Macmillan & Co. In its English form it consists of about 675 octavo pages, having the general appearance both in type, illustrations, paper and binding of the well-known English editions of Sachs' Text Book.

For the benefit of those who are not familiar with the work, we give here its general contents:

PART I. THE FORMS OF TISSUE.

Chap. I. Cellular Tissue. (i) epidermis, (ii) cork, (iii) parenchyma.
“ II. Sclerenchyma.
“ III. Secretory Reservoirs.
“ IV. Tracheæ.
“ V. Sieve-Tubes.
“ VI. Laticiferous Tubes.
“ VII. Appendix. Intercellular spaces.

PART II. ARRANGEMENT OF THE FORMS OF TISSUE.

§ *1. Primary Arrangement.*

Chap. VIII. Tracheæ and Sieve-Tubes. (i) Arrangement, (ii) structure, (iii) development.
" IX. Primary parenchyma.
" X. Sclerenchyma and Sclerotic Cells.
" XI. Secretory Reservoirs.
" XII. Laticiferous Tubes.
" XIII. Intercellular Spaces.

§ *2. Secondary Changes.*

Chap. XIV. Secondary growth in thickness of normal dicotyledonous Stems and Roots. (i) Cambium, (ii) wood, (iii) bast.
" XV. Secondary changes outside the zone of thickening.
" XVI. Anomalous thickening in Dicotyledons and Gymnospores.
" XVII. Secondary thickening of the Stem and Roots of Monocotyledons and Cryptogams.

The publication of this work in this form will do much to stimulate a more exact study of the minute anatomy and development of the various organs of plants, and will, we trust, do not a little towards placing botanical work in this country upon something of the same basis as that of zoölogy.

JOURNAL OF MYCOLOGY.—There has been a feeling for a long while that this country should have a journal of mycology in which should be published all the descriptions of new species of fungi. The matter was talked over somewhat in Philadelphia last September by members of the Botanical Club of the A. A. A. S., and it has now so far taken form as to result in the issuance of a prospectus. It is to be " edited by J. B. Ellis, Newfield, N. J., and W. A. Kellerman, Manhattan, Kan. It will be issued about the 1st of each month, contain from twelve to fifteen pages, and be devoted exclusively to mycological botany, special attention being given to the North American Fungi. It will contain descriptions of new species as they appear from time to time; another leading feature will be the publication of monographs of different genera, with descriptions of all the North American species known—thus making, in fact, a manual of our fungi. A full account will also be given of all the current literature pertaining to this subject."

We bespeak for this much-needed journal a liberal patronage. The business management will be in the hands of Dr. Kellerman, to whom subscriptions ($1) should be sent.

BOTANICAL NOTES.—Friedlænder & Son, the well known booksellers of Berlin, have just issued three very valuable catalogues of books treating of cryptogamic plants. They are Nos. 357, 358 and 359, and we feel that we are doing good service to botanists in this country by calling attention to them.——J. G. Baker's Synopsis of the genus Selaginella in the *Journal of Botany* has reached the 219th species, and is still to be continued.——L. A. Bailey continues his Notes on Carex in the January *Botanical Gazette*, describing one new species, *C. nervina*, and one new variety, *C. muricata*, var. *confixa*, both from the Pacific coast.——Dr. Vasey, in the last *Torrey Bulletin*, describes three new grasses, viz., *Stipa scribneri* from New Mexico, *Festuca confinis* and *Elymus saundersii*, both from Colorado.——In the same journal H. W. Ravenel gives an account of a monster grape-vine in Beaufort county, S. C., which at the ground measures fifty-nine and a half inches in circumference, and " at two and a-half feet from the ground, where it divides into two branches, fifty-seven and a-half inches in circumference."

ENTOMOLOGY.

THE FLIGHT OF THE ROBBER FLIES DURING CONNECTION.—Both fly vigorously though their heads are in opposite directions, the female, by her greater size, controlling the course. The difference in pitch of the two sets of wings is very striking.—*J. E. Todd.*

NOTES ON THE MOUNDS OF THE OCCIDENT ANT.—The mounds built by the *Pogonomyrmex occidentalis* can hardly fail to attract the attention of any observing traveler.

A neatly smoothed bare spot, from three to five feet in diameter is found in the grass and in its center is a mound of quite symmetrical form. This mound is frequently covered entirely with coarse sand or fine gravel, even when the surrounding surface shows little of this material.

It would seem, at first, that the ants, guided by some instinct, selected the material which would best secure their structure from the wind and the rain.

During the past season the writer has found opportunity to test this point. A little watching showed that the excavation below the surface and the building of the mound are carried on by two different sets of workers, one continually bringing out particles from within and dropping them upon the court or bare space around the mound, the other picking up particles from the surface of the court and depositing them upon the mound. The coarseness of the material seems to be determined by the desire of a worker to find as large a particle as he can conveniently carry. For instance, when, as in the case observed, the crust of the ground was broken by the tramping of a horse, medium sized pieces were deposited upon a mound, but none of the smallest and of course none of the largest, as ants have not learned to work otherwise than individually. When particles of broken glass were scattered upon a court they were quickly found and in spite of their angular and polished surface were soon carried and dropped upon the mound. The coarseness and uniformity of the material,